Microfabrication Applications Laboratory @UIC

Who we are:

The MAL at the University of Illinois at Chicago is a versatile MEMS/Nano facility accessible to non-profit and industrial researchers.
The MAL enables research by providing access, training, service and process guidance on fabrication and characterization equipment.
Research, Development, and Prototyping of: MEMS/Nano devices, BioMEMS, Microfluidics, Chemical and Photonic devices, and more.

Management of MAL as multi-user facility.

* Appropriate laboratory, cleanroom, common space and sharing of equipment necessary to accommodate external users.
* Sensible policies that all users are required to follow www.mal.uic.edu/policies.asp
* User fees for UIC, external non-profit and industrial users.
* The MAL has 40 full time users:
  15 from UIC, 12 from external non-profit institutions, 13 industrial researchers
  (62.5% external users), and 20 part-time users.
* Equipment and process training by MAL staff.
  MAL staff have the required training and expertise to instruct users in laboratory safety, equipment operation, processing techniques and process development.
* 5 full time and 1 part-time staff members.
* Remote access to MAL facilities for the local, national, and international researchers.

MAL user policies

Full time access fees:
$1.5k/quarter non-profit
$5k/quarter industrial

Access fees include:
Mask making, Silicon DRIE, Silica/Pyrex DRIE, and E-beam lithography.

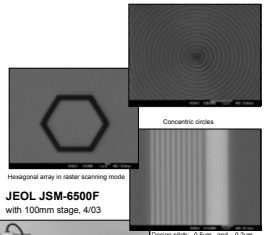
Where we are:

The MAL offers a midwest location and is close to downtown Chicago. It is easily accessible by public transportation from Midway and O'Hare international airports, and is within walking distance of rail and bus lines. Chicago is within a four hour flight from all major North American airports. Fly from nearly any U.S. city and return on the same day. Served by six interstate highways.

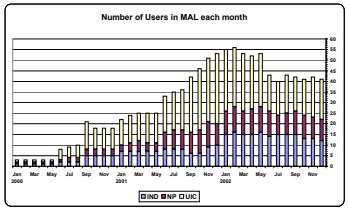
What we offer: [MAL Facilities]

Basic fabrication capabilities:
Mask Making (Pattern generation and reticle stepping),
Mid/Deep-UV, top & bottom alignment (Karl Suss MA6 and MJB3 mask aligners),
Oxidation and diffusion,
LPCVD of silicon nitride, polysilicon and LTO films,
RIE and PECVD,
Bulk and surface micromachining,
Rapid thermal processing,
Sputtering and E-beam metal deposition.
Back-end
Wafer dicing, die bonding and lead attachment equipment.
Advanced processes at the MAL:
DRIE for silicon (Oxford System100 with ICP180)
DRIE for silica/pyrex (STS-AOE)
LIGA capability at Argonne's Advanced Photon Source.
E-beam lithography/SEM (JEOL JSM 6500F, 20nm features).
Unusual processes and materials:
Conformal polymer deposition and processing.
Processing non-standard materials on case by case basis.
Characterization equipment
Optical and contact profilometry.
Scanning probe microscopy with AFM, MFM and electrochemical capability.
High speed 10kHz camera, & Thin film stress measurement.
Adjacent to the MAL
UIC's Research Resources Center (RRC) www.rrc.uic.edu
North American demo site for JEOL
Cs corrected HB601UX 100kV CFE STEM with sub-Å resolution and 0.4eV energy resolution (1 of 5 in world)
JEOL JEM 2010F SFE 200kV TEM/STEM. 1.3Å resolution & 1.2eV energy resolution for EELS, & X-ray analysis
JEOL JEM-3010 TEM and X-ray analysis
many other analytical tools and state of the art specimen preparation.

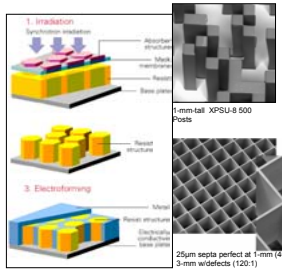
Oxford System100 with ICP180
DRIE for Silicon, Bosch Process
Purchased in 2002



JEOL JSM-6500F
with 100mm stage, 4/03

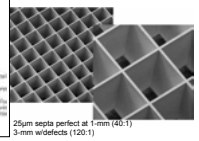


Sensible user policies and user-oriented management led to an exponential growth in our full time user base for over 3 years. The recent economic downturn has cut slightly into our user population.

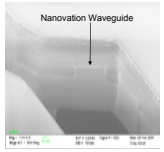


LIGA process in collaboration with ANL

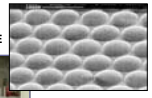
1-mm-tall XPSU-8 500 Posts



25µm septa perfect at 1-mm (40:1)
3-mm widefects (120:1)
courtesy of ANL



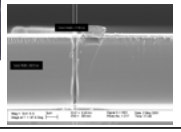
STS Multiplex AOE



Plasma etched silica lens array micrograph courtesy of STS

DRIE for Silica/Pyrex
Vertical Aspect Ratio up to 100
Purchased in 2002 from Nanovation

1-µm Nanovation trench etched 18 µm deep



Karl Suss MA6 Mid/Deep UV top/bottom aligner

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